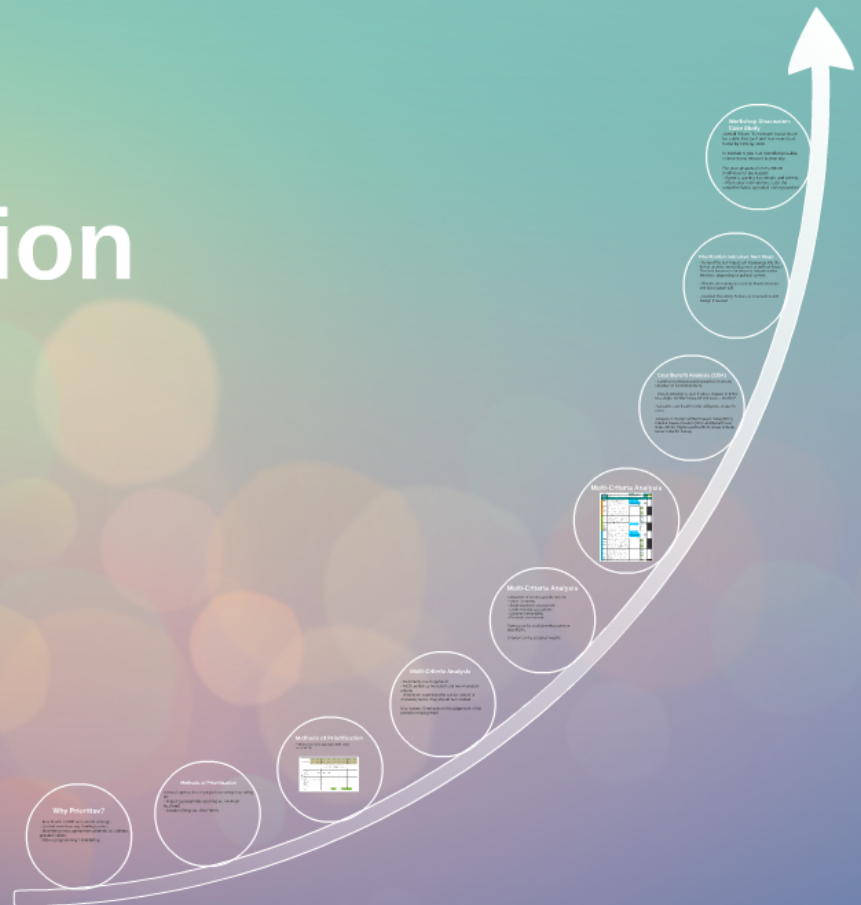


# Module 4: Intervention Prioritisation

Urban Mobility Workshop  
Constanta / Brasov / Cluj-Napoca  
May 2014

## Presentation Outline

- Why Prioritise?
- Methods of Prioritisation
- Multi-Criteria Analysis (MCA)
- Cost Benefit Analysis (CBA)
- Prioritisation Outcomes: Next steps
- Workshop discussion



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- Why Prioritise?
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- Best fit with
- Limited reso
- Identifying m
- greatest need
- Allows progr

# Why Prioritise?

- Best fit with SUMP and overall strategy;
- Limited resources e.g. funding issues;
- Identifying most appropriate schemes i.e. address greatest needs;
- Allows programming / timetabling

## Methods of Prioritisation

Several approaches to project screening depending on:

- Impact (severe/wide-reaching vs. minimal/localised)
- Duration (long- vs. short-term)



# Methods of Prioritisation

Performance matrix approach often used.  
For example:

OPTION SELECTION MATRIX		OPTION 1:	OPTION 2:	OPTION 3:	OPTION 4:	OPTION 5:	OPTION 6:	OPTION 7:	OPTION 8:	OPTION 9:
		Travelator / Moving Walkway	Conventional Bus Operations in mixed traffic	Conventional Bus Operations on Exclusive Busway	Conventional Bus Operations on Guided Busway	Light Rail / Tram	Train-Tram	Personal Rapid Transit	Automated People Mover	Heavy Rail
EVALUATION CRITERIA		Describes how the option performs against the criteria. ✓ - conforms to requirements ✗ - does not conform (i.e. Fatal flaw) (blank implies that the technology does not present notable advantage or disadvantage in criterion)								
	Cost									✗
	Programme									
	Constructability									✗
	Environmental Impact / Sustainability		✗ (for diesel buses)	✗ (for diesel buses)	✗ (for diesel buses)					
	Health and Safety						✗			
	Acceptability to Third Parties					✓	✗	✓	✓	
	Risk		✗	✗	✗					
	Compliance with Standards / Requirements	✗ (journey time)	✗ (journey time)	✓	✓	✓	✓	✓	✓	
	Capacity (Day one demand of 250 passengers per 15-minute peak)	✓	✓	✓	✓	✓	✓	✓	✓	
	Scalability		✗	✗	✗	✓	✓	✓	✓	
	Wait-time / Frequency is ≤ 5 minutes									✗
ACTION						Taken forward for further consideration		Taken forward for further consideration	Taken forward for further consideration	

OPTION SELECTION MATRIX		OPTION 1 :	OPTION 2 :	OPTION 3 :	OPTION 4 :	OPTION 5 :	OPTION 6 :	OPTION 7 :	OPTION 8 :	OPTION 9 :
		<i>Travelator / Moving Walkway</i>	Conventional Bus. Operations in mixed traffic	Conventional Bus. Operations on Exclusive Busway	Conventional Bus. Operations on Guided Busway	Light Rail / Tram	Train-Tram	Personal Rapid Transit	Automated People Mover	Heavy Rail
EVALUATION CRITERIA		<i>Describes how the option performs against the criteria.</i> ✔ - conforms to requirements ✗ - does not conform (i.e. Fatal flaw) (blank implies that the technology does not present notable advantage or disadvantage in criterion)								
	Cost									✗
	Programme									
	Constructability									✗
	Environmental Impact / Sustainability		✗ (for diesel buses)	✗ (for diesel buses)	✗ (for diesel buses)					
	Health and Safety						✗			
	Acceptability to Third Parties					✔	✗	✔	✔	
	Risk		✗	✗	✗					
	Compliance with Standards / Requirements	✗ (journey time)	✗ (journey time)	✔	✔	✔	✔	✔	✔	
	Capacity (Day one demand of 250 passengers per 15-minute peak)	✔	✔	✔	✔	✔	✔	✔	✔	
	Scalability		✗	✗	✗	✔	✔	✔	✔	
	Wait-time / Frequency is ≤ 5 minutes									✗
ACTION						Taken forward for further consideration		Taken forward for further consideration	Taken forward for further consideration	

# Multi-Criteria Analysis

- Commonly used approach
- MCA combines monetary and non-monetary criteria
- Whenever costs/benefits can be valued in monetary terms, they should be included

Key feature: Emphasis on the judgement of the decision making team



# Multi-Criteria Analysis

Categories of criteria typically include:

- Value for money
- Socio-economic assessment
- Environmental assessment
- Scheme deliverability
- Financial assessment

Scoring can be qualitative/descriptive or quantitative

Criterion can be assigned weights

# Multi-Criteria Analysis

Appraisal Summary Table		Date prepared: 22/04/2014		Contact:	
Name of scheme: New Hourly Rail Shuttle to Brasov Station		Name: RPA		Name: RPA	
Description of scheme: Brasov Station will be served by an hourly 'Shuttle' train service between Bucuresti and Sighisoara on 7 days per week.		Organisation: RPA		Organisation: RPA	
Date: 22/04/2014		Author: RPA		Author: RPA	
Impacts	Summary of key impacts	Assessment		Monetary Value	Discounted Net Social Vulnerability
		Quantitative	Qualitative		
Economy	Access to rail transport	Value of journey time changes (V)		£ 1,148,728	
	Access to rail transport	Net journey time changes (N)		£ 1,148,728	
	Access to rail transport	£/hr. time	< 0.5hr.	£ 1,148,728	
	Access to rail transport	£/hr. time	< 0.5hr.	£ 1,148,728	
	Access to rail transport	£/hr. time	< 0.5hr.	£ 1,148,728	
Environment	Accessibility impact on business cases	Value of journey time changes (V)		£ 1,148,728	
	Accessibility impact on business cases	Net journey time changes (N)		£ 1,148,728	
	Accessibility impact on business cases	£/hr. time	< 0.5hr.	£ 1,148,728	
	Accessibility impact on business cases	£/hr. time	< 0.5hr.	£ 1,148,728	
	Accessibility impact on business cases	£/hr. time	< 0.5hr.	£ 1,148,728	
Social	Accessibility impact on business cases	Value of journey time changes (V)		£ 1,148,728	
	Accessibility impact on business cases	Net journey time changes (N)		£ 1,148,728	
	Accessibility impact on business cases	£/hr. time	< 0.5hr.	£ 1,148,728	
	Accessibility impact on business cases	£/hr. time	< 0.5hr.	£ 1,148,728	
	Accessibility impact on business cases	£/hr. time	< 0.5hr.	£ 1,148,728	

Appraisal Summary Table			Date produced: 23/04/2014		Contact:	
Name of scheme: New Hourly Rail Shuttle to Brasov Station			Name: XXX			
Description of scheme: Brasov Station will be a served by an hourly 'Shuttle' train service between Bucuresti and Sighisoara on 7 days per week.			Organisation: XXX			
			Role: Promoter/Official			
Impacts		Summary of key impacts		Assessment		
				Quantitative		Qualitative
				Monetary £(NPV)		Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	<p>Travel time and cost savings for those switching from car to rail over the 60 year appraisal period, it is estimated that some 224 million car-kms will be saved from this switch.</p> <p>Travel time savings: 7.0% of the total trips are expected to be Business-related journeys. The most significant benefits are expected from the Bucharest market: the generalised journey time per person shifting from road to rail is expected to be reduced from 411 minutes to 182 minutes.</p> <p>Out-of-pocket savings, these are derived from vehicle operating cost savings due to switchers from car to rail, and a resulting reduction in car use.</p>	<p>Value of journey time changes(£)</p> <p>Net journey time changes (£)</p> <p>0 to 2min 2 to 5min &gt; 5min</p> <p>- - € 11,486,726</p>	Time savings:	€ 11,486,726	VOC Savings: € 774,600
	Reliability impact on Business users	Reliability impacts have not been quantified.	N/A	Beneficial (post-electrification)	N/A	
	Regeneration	N/A	N/A	N/A	N/A	
	Wider Impacts	Improved overall accessibility of Brasov residents to other employment and housing opportunities. Conversely, population from rest of Romania and tourists will enjoy similar, improved accessibility to Brasov.	N/A	Beneficial	N/A	
		Although not quantifiable, there is improved overall access to more productive jobs, especially those living in those catchment areas within one change on the improved railway network				
Environmental	Noise	The estimated net reduction of highway passenger miles and car trips is expected to also reduce the local noise level. However, as baseline data on noise are not available, the potential benefits cannot be quantified.	N/A	Slight beneficial	N/A	
		During the construction of the scheme, some temporary noise impacts may be expected.				
	Air Quality	A reduction in emissions is produced as trips shifting to rail result in a net reduction in highway passenger miles travelled. As baseline air quality data and specific knowledge on the routes where the mode shift could occur were not available, the potential benefits were not quantified.	N/A	Slight beneficial	N/A	
		During construction, temporary negative impacts can be expected.				
	Greenhouse gases	It is forecasted that some 23,405 tonnes of CO2 will be saved due to the shift of passengers from road to rail. The monetised value of this saving has costed using non-traded carbon prices recommended by the World Bank.	Change in non-traded carbon over 60y (tonnes CO2e) -23,405	Slight beneficial	€ 1,289,389	
			Change in traded carbon over 60y (tonnes CO2e) -			
	Landscape	N/A	N/A	N/A	N/A	
	Townscape	The introduction of the station is expected to have minimal impact on the townscape as it will be built on an existing built-up site.	N/A	Neutral	N/A	
Social	Heritage of Historic resources	N/A	N/A	N/A	N/A	
	Biodiversity	N/A	N/A	N/A	N/A	
	Water Environment	The water environment will be protected and potential negative impacts mitigated through standard drainage and water management measures.	N/A	Neutral	N/A	
	Commuting and Other users	<p>The scheme will produce travel time savings and reduce the out-of-pocket costs for those switching from car to rail.</p> <p>52.2% and 40.2% of the total trips are expected to be Commuting and Other Trips respectively; the remainder are Business Trips. The most significant time savings are expected from the Bucharest market: the generalised journey time for an average traveller shifting from road to rail is expected to be reduced from 411 minutes to 182 minutes.</p> <p>Further off-peak growth due to tourism has not been quantified but it is expected that improved rail services will also draw more visitors to the local attractions such as Bran Castle.</p>	<p>Value of journey time changes(£)</p> <p>Net journey time changes (£)</p> <p>0 to 2min 2 to 5min &gt; 5min</p> <p>- - € 23,817,927</p>	Time savings:	€ 23,817,927	VOC Savings: € 9,417,509
	Reliability impact on Commuting and Other users	Reliability impacts resulting from the scheme have not been quantified as part of the Economic Case.	N/A	Beneficial (post-electrification)	N/A	
		Reliability benefits will likely be generated once the corridor is electrified. Although the timing of the electrification is still unclear, it is a committed initiative as demonstrated by the ROP and National Masterplan.				
	Physical activity	With some road users expected to shift to rail, those choosing to walk or cycle to Brasov Station and are expected to have improved physical fitness levels as a direct consequence.	N/A	Slight beneficial	N/A	
	Journey quality	<p>The scheme, particularly when the corridor is electrified, is expected to provide significantly improved ride smoothness and overall travel conditions for the traveller compared to bus services.</p> <p>Although not quantified, the electrification of the corridor is a committed government scheme therefore a benefit will be realised in the longer term. An electric service can result in a 'sparks effect' leading to a significant jump in patronage and revenue. Empirical evidence suggests a 1-2% increase.</p>	N/A	Beneficial (post-electrification)	N/A	
	Accidents	<p>The forecasted mode shift from road to rail can be expected to result in overall reduction of highway accidents since the system-wide passenger miles is reduced and fewer accidents per million passenger miles on rail system.</p> <p>The impacts of potential accident reductions have not been quantified.</p>	N/A	Slight beneficial	N/A	
	Security	The new railway station in Brasov will be designed to ensure a high level of security with the appropriate security measures meeting Căile Ferate Române (CFR) standards in place.	N/A	Slight beneficial	N/A	
	Access to services	The scheme will improve direct connectivity between Brasov, Bucharest, Sighisoara, and Campina. Further, the new stopping service also means that within one change, rail passengers can also get to most conurbations.	N/A	Beneficial	N/A	
	Affordability	The Economic Case assumes pricing parity for the new rail services and the parking facilities at Brasov.	N/A	Neutral	N/A	
	Severance	Brasov Station will be located on an existing rail line therefore will not result in any additional severance of the area.	N/A	Neutral	N/A	
Option values	The new station will increase the transport choices for the residents of Brasov for business, commuting as well as other (e.g. leisure) trips.	N/A	Beneficial	N/A		

# Iti-Criteria Analy

Appraisal Summary Table					Date produced:		23/04/2014		Contact:		
Name of scheme:		New Hourly Rail Shuttle to Brasov Station							Name	XXX	
Description of scheme:		Brasov Station will be a served by an hourly 'Shuttle' train service between Bucuresti and Sighisoara on 7 days per week.							Organisation	XXX	
									Role	Promoter/Official	
Impacts		Summary of key impacts			Assessment						
					Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp	
Economy	Business users & transport providers	<p><u>Travel time and cost savings</u> for those switching from car to rail: over the 60 year appraisal period, it is estimated that some 224 million car-kms will be saved from this switch.</p> <p>-<u>Travel time savings</u>: 7.6% of the total trips are expected to be Business-related journeys. The most significant benefits are expected from the Bucharest market: the generalised journey time per person shifting from road to rail is expected to be reduced from 411 minutes to 182 minutes.</p> <p>-<u>Out-of-pocket savings</u>, these are derived from vehicle operating cost savings due to switchers from car to rail, and a resulting reduction in car use.</p>			Value of journey time changes(£)				Time savings:		
					Net journey time changes (£)				€ 11,486,726		
					0 to 2min	2 to 5min			> 5min		VOC Savings:
					-	-			€ 11,486,726		€ 774,600
	Reliability impact on Business users	Reliability impacts have not been quantified.	N/A			Beneficial (post-electrification)	N/A				
Regeneration	N/A	N/A			N/A	N/A					
Wider Impacts	<p><u>Improved overall accessibility</u> of Brasov residents to other employment and housing opportunities. Conversely, population from rest of Romania and tourists will enjoy similar, improved accessibility to Brasov.</p> <p>Although not quantifiable, there is improved overall access to more productive jobs, especially those living in those catchment areas within one change on the improved railway network</p>	N/A			Beneficial	N/A					
Social	Noise	<p>The estimated net reduction of highway passenger miles and car trips is expected to also reduce the local noise level. However, as baseline data on noise are not available, the potential benefits cannot be quantified.</p> <p>During the construction of the scheme, some temporary noise impacts may be expected.</p>			N/A		Slight beneficial	N/A			
	Air Quality	<p>A reduction in emissions is produced as trips shifting to rail result in a net reduction in highway passenger miles travelled . As baseline air quality data and specific knowledge on the routes where the mode shift could occur were not available, the potential benefits were not quantified.</p> <p>During construction, temporary negative impacts can be expected.</p>			N/A		Slight beneficial	N/A			
	Greenhouse gases	It is forecasted that some 23,405 tonnes of CO2 will be saved due to the shift of passengers from			Change in non-traded carbon over 60y (tonnes)		23,405				



Economy		Out-of-pocket savings, these are derived from vehicle operating cost savings due to switchers from car to rail, and a resulting reduction in car use.	-	-	€ 11,486,726		€ 774,600	
	Reliability impact on Business users	Reliability impacts have not been quantified.  However, it is probable that some reliability benefits will be generated once the corridor is electrified. Although the timing of the electrification is still unclear at this time, it is a committed initiative as demonstrated by the ROP and National Masterplan.	N/A			Beneficial (post-electrification)	N/A	
	Regeneration	N/A	N/A			N/A	N/A	
	Wider Impacts	Improved overall accessibility of Brasov residents to other employment and housing opportunities. Conversely, population from rest of Romania and tourists will enjoy similar, improved accessibility to Brasov.  Although not quantifiable, there is improved overall access to more productive jobs, especially those living in those catchment areas within one change on the improved railway network	N/A			Beneficial	N/A	
Environmental	Noise	The estimated net reduction of highway passenger miles and car trips is expected to also reduce the local noise level. However, as baseline data on noise are not available, the potential benefits cannot be quantified.  During the construction of the scheme, some temporary noise impacts may be expected.	N/A			Slight beneficial	N/A	
	Air Quality	A reduction in emissions is produced as trips shifting to rail result in a net reduction in highway passenger miles travelled . As baseline air quality data and specific knowledge on the routes where the mode shift could occur were not available, the potential benefits were not quantified.  During construction, temporary negative impacts can be expected.	N/A			Slight beneficial	N/A	
	Greenhouse gases	It is forecasted that some 23,405 tonnes of CO2 will be saved due to the shift of passengers from road to rail. The monetised value of this saving has costed using non-traded carbon prices recommended by the World Bank.	<div>Change in non-traded carbon over 60y (tonnes CO2e)</div> <div>- 23,405</div> <div>Change in traded carbon over 60y (tonnes CO2e)</div> <div>-</div>			Slight beneficial	€ 1,289,389	
	Landscape	N/A	N/A			N/A	N/A	
	Townscape	The introduction of the station is expected to have minimal impact on the townscape as it will be built on an existing built-up site.	N/A			Neutral	N/A	
	Heritage of Historic resources	N/A	N/A			N/A	N/A	
	Biodiversity	N/A	N/A			N/A	N/A	
	Water Environment	The water environment will be protected and potential negative impacts mitigated through standard drainage and water management measures.	N/A			Neutral	N/A	
	Commuting and Other users	The scheme will produce travel time savings and reduce the out-of-pocket costs for those switching from car to rail.  52.2% and 40.2% of the total trips are expected to be Commuting and Other Trips respectively; the remainder are Business Trips. The most significant time savings are expected from the Bucharest market: the generalised journey time for an average traveller shifting from road to rail is expected to be reduced from 411 minutes to 182 minutes.  Further off-peak growth due to tourism has not been quantified but it is expected that improved rail services will also draw more visitors to the local attractions such as Bran Castle.	<div>Value of journey time changes(£)</div> <div>Net journey time changes (£)</div> <div>0 to 2min</div> <div>2 to 5min</div> <div>&gt; 5min</div> <div>-</div> <div>-</div> <div>€ 23,817,927</div>				Time savings:  € 23,817,927  VOC Savings:  € 9,417,509	
	Reliability impact on Commuting and Other users	Reliability impacts resulting from the scheme have not been quantified as part of the Economic Case.  Reliability benefits will likely be generated once the corridor is electrified. Although the timing of the electrification is still unclear, it is a committed initiative as demonstrated by the ROP and National Masterplan.	N/A			Beneficial (post-electrification)	N/A	



Social		on an existing built-up site.	N/A		Neutral	N/A	
	Heritage of Historic resources	N/A	N/A		N/A	N/A	
	Biodiversity	N/A	N/A		N/A	N/A	
	Water Environment	The water environment will be protected and potential negative impacts mitigated through standard drainage and water management measures.	N/A		Neutral	N/A	
	Commuting and Other users	The scheme will produce travel time savings and reduce the out-of-pocket costs for those switching from car to rail.  52.2% and 40.2% of the total trips are expected to be Commuting and Other Trips respectively; the remainder are Business Trips. The most significant time savings are expected from the Bucharest market: the generalised journey time for an average traveller shifting from road to rail is expected to be reduced from 411 minutes to 182 minutes.  Further off-peak growth due to tourism has not been quantified but it is expected that improved rail services will also draw more visitors to the local attractions such as Bran Castle.	Value of journey time changes(£)			Time savings:	€ 23,817,927
			Net journey time changes (£)				
			0 to 2min	2 to 5min	> 5min	VOC Savings:	€ 9,417,509
			-	-	€ 23,817,927		
	Reliability impact on Commuting and Other users	Reliability impacts resulting from the scheme have not been quantified as part of the Economic Case.  Reliability benefits will likely be generated once the corridor is electrified. Although the timing of the electrification is still unclear, it is a committed initiative as demonstrated by the ROP and National Masterplan.	N/A		Beneficial (post-electrification)	N/A	
	Physical activity	With some road users expected to shift to rail, those choosing to walk or cycle to Brasov Station and are expected to have improved physical fitness levels as a direct consequence.	N/A		Slight beneficial	N/A	
	Journey quality	The scheme, particularly when the corridor is electrified, is expected to provide significantly improved ride smoothness and overall travel conditions for the traveller compared to bus services.  Although not quantified, the electrification of the corridor is a committed government scheme therefore a benefit will be realised in the longer term. An electric service can result in a "sparks effect" leading to a significant jump in patronage and revenue. Empirical evidence suggests a 1-2% increase.	N/A		Beneficial (post-electrification)	N/A	
	Accidents	The forecasted mode shift from road to rail can be expected to result in overall reduction of highway accidents since the system-wide passenger miles is reduced and fewer accidents per million passenger miles on rail system.  The impacts of potential accident reductions have not been quantified.	N/A		Slight beneficial	N/A	
	Security	The new railway station in Brasov will be designed to ensure a high level of security with the appropriate security measures meeting Căile Ferate Române (CFR) standards in place.	N/A		Slight beneficial	N/A	
Access to services	The scheme will improve direct connectivity between Brasov, Bucharest, Sighisoara, and Campina. Further, the new stopping service also means that within one change, rail passengers can also get to most conurbations.	N/A		Beneficial	N/A		
Affordability	The Economic Case assumes pricing parity for the new rail services and the parking facilities at Brasov.	N/A		Neutral	N/A		
Severance	Brasov Station will be located on an existing rail line therefore will not result in any additional severance of the area.	N/A		Neutral	N/A		
Option values	The new station will increase the transport choices for the residents of Brasov for business, commuting as well as other (e.g. leisure) trips.	N/A		Beneficial	N/A		

# Cost Benefit Analysis (CBA)

- Common technique purely based on monetary valuation of the interventions.
- CBA is attractive to use: it values impacts in terms of a single, familiar measurement scale – MONEY
- Valuations are based on the willingness to pay by users
- Outputs in the form of Net Present Value (NPV), Internal Rates of Return (IRR) and Benefit Cost Ratio (BCR): Higher positive BCR values indicate better value for money

## Prioritisation Outcomes: Next Steps

- None of the techniques can incorporate into the formal analysis every judgement or political impact: The final decision to be taken by officials and/or Ministers, depending on political content
- Results from analysis to inform those decisions and leave paper trail
- Detailed Feasibility Studies on intervention and Design if needed

# Workshop Discussion: Case Study

Overall Vision: To increase modal share for public transport and non-motorised travel by 10% by 2020

In Module 3, you had identified possible interventions relevant to your city.

For your proposed interventions (individual or packages):

- Agree a scoring framework and criteria,
- Rank your interventions. Use the simplified MCA appraisal sheet provided.